HARRIS®
assuredcommunications®

ZX® Transmitter Series

Tri-Mode FM — HD Radio™ — FM and HD Radio
125-11000 W

Unleashing the full power of FM radio with the most cost–effective and reliable digital and solid–state technologies

HD Radio®

ZX®

ZX® Transmitter Series

Proven Platinum™ Z Technology—Compact Package

Harris has shipped hundreds of ZX® transmitters since the launch of the product line in 2006. Based on the world-class Platinum™ Z series, the ZX line of FM transmitters is perfect for small markets as a main analog transmitter, as well as for HD Radio™ applications at the largest stations. It can also be used as an emergency "Flyaway" FM transmitter.

The ZX series incorporates a complete, yet simple control system designed for long, trouble-free service. The optional Web interface permits a user to monitor and control the transmitter (and external accessories) via a standard TCP/IP connection, with features such as logging or fault notification via e-mail.

The flexibility of the ZX design allows for a wide range of exciter options, including the Harris® FlexStar® exciter, providing unrivaled features for FM and HD Radio; Harris Digit® CD, the world's most popular FM exciter; Harris MicroMax® exciter for quality analog performance, offering front-panel frequency selection and optional AES input; or any standard 50 W FM exciter. The broadband design of the ZX is ideally suited to N+1 for instant multichannel operation, providing a compact, reliable backup for analog or HD Radio. The ZX transmitter supports tri-mode operation with on-the-fly switching among analog, FM and HD Radio common amplification or HD Radio digital-only operation, making an HD Radio upgrade a snap.

The hinged front panel offers excellent access to interior components for ease of maintenance. Built-in RF directional couplers provide accurate power measurement via an RF sample port with a rear-mount BNC connector ideally suited to drive test equipment such as a modulation monitor or spectrum analyzer. The ZX meets or exceeds all applicable FCC, Industry Canada, CCIR and IEC-215 specifications. It is RoHS- and CE-compliant.

FEATURES

- Power levels from 125 to 11000 W
- Tri-mode operation; FM, FM + HD Radio, HD Radio only
- Hot-pluggable, field-proven Z FM linear RF amplifier modules rebiased on-the-fly
- Hot-pluggable, auto-ranging power supplies
- Built-in MOV transient voltage suppression on incoming AC mains lines
- Internal harmonic filter with high-energy DC return for lightning protection
- Built-in parallel interface for remote control, status and metering; RFI and transient protected
- Proportional VSWR foldback for safe operation at reduced power into marginal loads (icy antenna, etc.)

FlexStar HDx World-Class Performance

The Heart of Every ZX HD Radio Transmitter

The FlexStar HDx FM/HD exciter creates both the analog and HD Radio signals, and features Real-Time Adaptive Correction (RTAC™), so you can be assured of superior mask compliance, maximum possible power output and the best efficiency.

The HDx is the most advanced exciter on the market today. Dual AES, analog left and right, dual composite and mono audio inputs provide the user with maximum flexibility in implementation. The integrated digital stereo generator with adjustable composite limiter provides the top performance needed for competitive markets. Additionally, two SCA generators and RBDS encoding are built-in features. The unique Harris front-panel spectral display offers the user instant verification of mask compliance.

Simply add the Harris HDE-200 program exporter for basic HD and the HDI-100 data importer for advanced applications services (AAS), such as supplemental audio channels (multicast) or additional data services.

With the combination of the FlexStar exciter and the ZX line of transmitters, you can feel confident that you are prepared for the future in the event that elevated side band operation becomes a reality, since FlexStar was used in the major HD Radio tests conducted around the United States. With a simple software upgrade, the FlexStar can increase from -20 dBc sideband to -10 dBc, with full adaptive correction for ensured compliance.

Digit CD Digital FM Exciter

The World's Most Popular FM Exciter

The Digit CD digital FM exciter builds on the strengths that have made Harris Digit the industry-standard FM exciter. Among the benefits that customers can realize are improved stereo signal-to-noise, AM noise null, and the ability to synchronize to an external reference for use in on-channel booster systems.

Standout CD sound — forever!

Absolutely no tweaking required

Digit CD delivers the best possible sound. Field-changeable input modules let you easily upgrade from analog to digital in minutes, and a broadband design eliminates tuning and makes N+1 operation truly practical. N+1 frequency agility permits on-the-fly switching of frequencies. This is perfect for a broadband transmitter acting as a backup to multiple stations in a market.

Digit CD recently shipped the 5,000th production model. This second-generation digital exciter is used at more radio stations worldwide than any other FM exciter.

Global Monitoring and Control

Harris offers a compact monitoring and control system for use with the ZX family of transmitters and other supporting equipment. The Web Remote system provides reliability and a small form factor due to a contemporary design that uses no moving parts. Simply mount the Web Remote card into the pre-wired slot in the ZX chassis, connect your equipment to the Internet or LAN, and you have complete monitoring and control capability in any location. Setup may be customized to allow for alarms once any set parameter violates a user-selectable threshold. A user-definable map page allows tracking of multiple ZX transmitters from one PC over a large geographical area.

Multiple Site Interface

Web Interface Remote

Web Remote Includes:

- RJ-45 Internet connection with built-in Web server
- HTTP Web browser control by PC or smartphone
- On-board, real-time clock with backup capacitor
- SNMP V.1 SET, GET and TRAP functionality
- E-mail notification of faults
- Event log, which captures control and faults events

Transmitter Rack Options

An alternative is a completely integrated rack, specifically designed to house a ZX chassis in the lower bay, with isolated air ducting and a sealed and vented rear door. This provides 20RU of rack space (less the exciter), a 1-5/8 in. EIA female flanged output at the top of the rack, single AC connection with optional AC distribution panel, ground bar, front-panel closeout plates, a side panel kit and an upper compartment exhaust/flushing fan.

A second option is a basic rack that has mounting rails for the transmitter and a side panel kit.

Closed Air Rack Option

In addition, the air input plenum provides a ducted top or bottom air input, and a plexiglass door provides excellent visibility of operating status. The 37RU PA-only rack provides 10 kW of amplification in 37RU height. Exciters and other PIE equipment are mounted in a separate rack and may simplify site layout or air handling in some situations.

Designed For Quick Installation

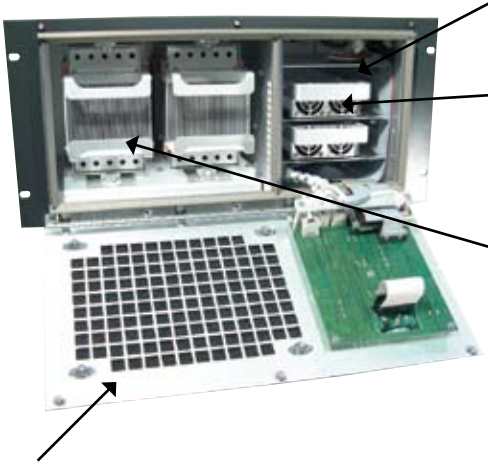
The compact ZX rackmount design makes integration into your system a snap. AC power mains connect via an included twist-lock (optional PowerCon®) or IEC-type connectors to the rear of the unit. Industry-standard Type N, 7/8 in. or 1-5/8 in. unflanged output makes for a quick connection to the RF antenna. Complete parallel remote control connections are made via a DB–25 connector, while interlock and exciter control are handled via standard modular connections. An RJ–45 connector for the Web Remote card rounds out the logic connections. Standard BNC provides connection for the exciter drive, and an RF sample drives monitoring equipment.

Optional AC Breakout Panel

Harris also offers several versions of a 2RU rackmounted AC distribution panel for customers who wish to only wire in or connect one 60 amp AC input or front panel disconnects. This panel offers a single, WAGO-style AC wiring input, with front-panel, discrete, rocker-style thermal circuit breakers for each AC input (as well as for three auxiliary switches, exciters or other items in the rack).

ZX® Transmitter Series

ZX1000



Web Remote
Optional Web Remote card provides full system monitoring and control via standard Web browser software.

Power Supplies
Auto–ranging, hot–pluggable power supplies provide automatic voltage regulation to compensate for power line fluctuation. Redundant supplies keep transmitter on–air in case of a supply failure.

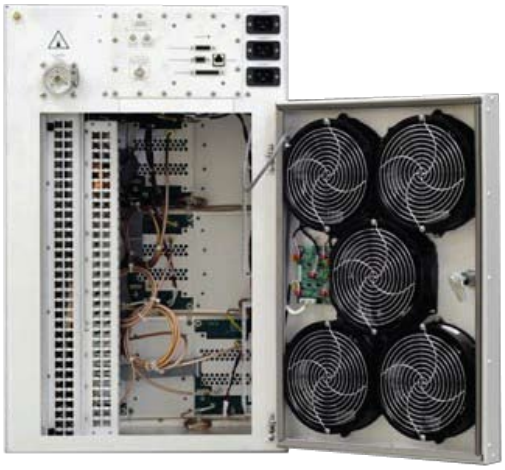
Platinum Z Module
Tri–Mode FM module is the heart of the ZX transmitter, and hot-pluggable, while providing the same quality service as the Platinum Z.

Hinged Front Panel
Hinged front panel provides easy access to all RF and power supply modules. Integrated, removable air filter uses washable material for simple service.

ZX5000

ZX2500

ZX3750



ZX2500 Rear

ZX Series

Depopulated versions of the ZX transmitter 16RU chassis are available for the ZX2500 and ZX3750 series, featuring the same quality and reliability. Combined versions for 7.5 and 10 kw power levels are also available.

Exciter Guide

ZX-MX includes MicroMax; ZX-CD includes Digit CD; ZX-FLX includes analog FlexStar; exciter purchased separately.

RF Output Type and Typical Configurations

The ZX2500, ZX3750 and ZX5000 RF outputs are an un-flanged 1-5/8 in. EIA male connectors, allowing an unflanged elbow or line section to fit directly in the connector. The 1-5/8 in. anchor insulator connector or "bullet" is included standard.

- Self-contained, mechanically "clean" 16RU package
- 5x fan redundancy
- 3x AC mains redundancy
- Precision directional coupler at output for monitoring individual PA
- Rear door opens to provide easy accessibility to modular combiner/low pass filter and other circuitry

ZX Configuration

Each ZX transmitter combines an exciter and amplifier bays with various configurations of power amplifier modules to achieve the rated power.

The amplifier bays contain several major systems:

Power Amplifier (PA) The hot-pluggable PA module features a pair of broadband (87.5 to 108 MHz) RF power amplifiers that require no user adjustments. Each amplifier can be easily replaced with a pre-tuned pallet, eliminating the need for optimization in the field. The PA modules are identical and fully interchangeable among all power classes in the ZX transmitter family, regardless of configuration. Each amplifier can be re-biased on-the-fly for operation in FM, FM + HD Radio and HD Radio-only mode.

Power Supply (PS) The hot-pluggable PS module is a 1200 W, 48 V power supply with a .98 power factor and mains input range of 90 to 264 V. The PS interface provides on/off functionality to the power supplies, a fan tachometer alarm, and redundant feed to the cooling system. Each module also has +5 V output to redundantly drive the low-voltage control circuits.

Cooling System The air cooling system includes internal redundant blowers, which pull cool air from the front through a removable filter, and exhausts in the rear.

Control System The main system control has extensive protection and control capabilities. It is located in the ZX amplifier bay and communicates with the exciter for mode switching. Each PA module has dedicated control and monitoring to support on/off functionality and alarms for reflected power, temperature and current overloads. The control system can be supplemented with a Web Remote card for Ethernet-based monitoring and remote control.

Specifications

Specifications are subject to change without notice.

General

Analog FM Power Output Range[1]			
ZX500	125 to 550 W		
ZX1000	250 to 1100 W		
ZX2500	625 to 2750 W		
ZX3750	937 to 4125 W		
ZX5000	1250 to 5500 W		
ZX7.5	1800 to 8200 W		
ZX10	2500 to 11000 W		
FM+HD Power Output Range[2,4]			
HD Signal Injection Ratio	-20dBc	-14dBc	-10dBc
ZX500	103 to 413 W	78 to 314 W	67 to 267 W
ZX1000	213 to 852 W	157 to 628 W	134 to 534 W
ZX2500	532 to 2130 W	393 to 1570 W	334 to 1335 W
ZX3750	798 to 3195 W	589 to 2355 W	501 to 2003 W
ZX5000	1065 to 4260 W	785 to 3140 W	668 to 2670 W
ZX7.5	1598 to 6390 W	1178 to 4710 W	1002 to 4006 W
ZX10	2130 to 8320 W	1570 to 6280 W	1335 to 5340 W
HD-Only Power Output Range[3,4]			
HD Signal Injection Ratio	-20dBc	-14dBc	-10dBc
ZX500	50 to 200 W	49 to 194 W	43 to 171 W
ZX1000	100 to 400 W	97 to 388 W	86 to 342 W
ZX2500	250 to 1000 W	243 to 970 W	214 to 855 W
ZX3750	375 to 1500 W	364 to 1455 W	321 to 1283 W
ZX5000	500 to 2000 W	485 to 1940 W	428 to 1710 W
ZX7.5	750 to 3000 W	728 to 2910 W	642 to 2506 W
ZX10	1000 to 4000 W	970 to 3880 W	855 to 3420 W

[1]VSWR 1.2:1 or less. De-rate to nameplate rating for VSWR up to 1.5:1
[2]VSWR 1.2:1 or less. De-rate to 70% of nameplate rating for VSWR up to 1.5:1
[3]VSWR 1.2:1 or less. De-rate to 35% of nameplate rating for VSWR up to 1.5:1
[4]Applicable to HD versions of the Flexstar exciter only

RF Output Connector

ZX500, ZX1000	Type N female, 50 ohms
ZX2500, ZX3750	EIA 1 5/8 in. male flangeless 50 ohms
ZX5000	EIA 1-5/8 in. male flangeless, 50 ohms
ZX7.5, ZX10	1 5/8 in. or 3 1/8 in. male flanged, selectable at time of order

AC Mains Requirement

ZX500, ZX1000	90 to 264 V AC single phase, 47 to 63 Hz
ZX2500, ZX3750, ZX5000	190 to 264 V AC, 47 to 63 Hz single phase or 3-phase, field configurable, Unit uses 3 single phase inputs, will continue to operate at reduced power on loss of 1 or 2 AC inputs
ZX7.5, ZX10	190 to 264 V AC, single phase or 3-phase, 360-415 3-phase 4 wire, 47 to 63 Hz Unit uses 3 single phase inputs, will continue to operate at reduced power on loss of 1 or 2 AC inputs

Power Consumption: (FM mode at nameplate power level)

ZX500	1000 W max; 950 W typical
ZX1000	2000 W max; 1900 W typical
ZX2500	4000 W max; 3800 W typical
ZX3750	6600 W max; 6350 W typical
ZX5000	8500 W max; 7850 W typical
ZX7.5	13636 W max; 12931 W typical
ZX10	18000 W max; 17599 W typical
Power Factor (displacement)	0.98 typical

Environmental and Physical

Altitude	To 10,000 ft (3,048 m) above mean sea level
Ambient Temperature Range	
Analog FM Mode	32° to 122° F (0° to 50° C) derated 2° C per 1,000 ft (304.8 m) AMSL
Humidity	To 95%, non-condensing
Dimensions	Standard 19 in. (48.3 cm) EIA rack; 1RU = 1.75 in. (4.45 cm)
ZX500	5RU amp + 4RU exciter, 23.6 in. (60 cm) D
ZX1000	5RU amp + 4RU exciter, 23.6 in. (60 cm) D
ZX2500	16RU amp + 4RU exciter, 24.5 in. (62 cm) D
ZX3750	16RU amp + 4RU exciter, 24.5 in. (62 cm) D
ZX5000	16RU amp + 4RU exciter, 26.4 in. (67 cm) D
ZX7.5, ZX10	22.13 in. (562.1 mm) W X 36 in. (914.4 mm) D X 83.13 in. (2111.5 mm) H 44 RU rack

ZX® Transmitter Series

Weight Less Exciter (all modules installed)	
ZX500	50 lbs (23 kg)
ZX1000	65 lbs (28 kg)
ZX2500	150 lbs (67 kg)
ZX3750	180 lbs (81 kg)
ZX5000	198 lbs (90 kg)
ZX7.5	500 lbs (225 kg)
ZX10	550 lbs (250 kg)

Specifications with FlexStar HDx-FM exciter

Excitation	FlexStar HDx digital FM/HD exciter
Frequency Range	87.5 to 108 MHz programmable in 10 kHz steps
Frequency Stability	± 150 Hz, 32° to 122° F (0° to 50° C) using high-accuracy internal (59.535 MHz) TCXO; 10 MHz input for synchronization to external (GPS) reference; automatic switching to internal oscillator if external reference fails
VSWR	Protected against open or short circuit, all phase angles; capable of operation into infinite VSWR with user-adjustable foldback threshold; factory pre-set to 2.5% of nominal nameplate power
Harmonic/Spurious Suppression	Internal harmonic filter meets or exceeds all FCC, IC, CE, CCIR and IEC215 requirements; meets or exceeds standard NRSC-5A emission limits in all modes
Modulation Types	FM digitally synthesized direct-to-channel, HD digital direct-tochannel, FM+HD digital direct-to-channel
Operating Modes	"On the fly" switching between FM only, HD only, FM+HD
FM Modulation Capability	Greater than ± 300 kHz
Asynchronous AM S/N Ratio	55 dB minimum below equivalent 100% amplitude modulation by 400 Hz using 75 µs de-emphasis (no FM modulation present)
Synchronous AM S/N Ratio	50 dB minimum below equivalent 100% amplitude modulation with 75 µs de-emphasis and 400 Hz high-pass filter (FM deviation +/-75 kHz by a 1kHz sine wave); measured at wideband input

Input/Output

External Frequency Control	Parallel I/O control of up to 8 frequencies; unlimited frequency selection via optional N+1 controller
AES3 Audio Inputs	(2) auto-switching AES-3 inputs, female XLR, 110 ohms balanced; -2.8 dBfs nominal; adjustable level from 0 dBfs to -15 dBfs in 0.1 dB steps for +/- 75 kHz deviation; input sample rate 32 to 96 kHz
Analog L/R Inputs	Female XLR, >10K ohms, balanced, resistive; default level is +10 dBu for +/-75 kHz deviation; level adjustable from -10 dBV to +10 dBV
Analog Composite Input	(2) BNC inputs (1 balanced, 1 unbalanced); balanced impedance is 10 K ohms or 50 ohms (selectable); unbalanced is 10 K ohms; Input level: 3.5 V pk-pk for +/-75 kHz deviation; adjustable 2 V pk-pk to 5 V pk-pk
SCA Audio Inputs	(2) inputs combined on one 5-pin XLR female connector (mating male connector supplied); >10K ohms balanced, resistive; +10 dBV nominal for +/- 6 kHz of FM sub-carrier
External SCA inputs	(2) BNC female, unbalanced; >10K ohms; 1.5V pk-pk nominal for +/-7.5 kHz (10%) deviation of main carrier; adjustable from 1 V pk-pk to 4 V pk-pk
RBDS Data Input	Sub-D 9-pin female RS-232
External 10 MHz Clock Input	BNC female, unbalanced, 50 ohms, -10 dBm to +10 dBm
External 1 PPS Clock Input	BNC female, unbalanced, 50 ohms, TTL level
User Remote Interface	D 25-pin female
N+1 Interface	Sub-D 25-pin female
RF Sample Out	BNC jack, -66 dBc, post harmonic filter
19 kHz Pilot Sync Output	BNC female, unbalanced, 50 ohms resistive, sine wave, AC coupled, 4.5 V pk-pk nominal, unterminated
Exciter Communication Ports	(2) Sub-D 9-pin female; RS-232 protocol, for RBDS or VT-100 data
Exciter Ethernet Ports	(2) RJ-45 on main processor board; (2) RJ-45 on Exgine board (HD version only); all Ethernet ports 10/100; supports static or dynamic IP address

Stereo Generator Performance (AES-3 or analog inputs)

Modes	Stereo, Mono L+R, Mono L, and Mono R; remote controllable
Pre-emphasis	Selectable 0, 25, 50, or 75 µs
Stereo Pilot Tone	19 kHz ± 0.03 Hz; injection adjustable 0% to 12% in 0.05% steps; nominal: 9%. 38 kHz, 57 kHz, 76 kHz, 95 kHz Suppression: 80 dB below +/-75 kHz deviation
Stereo Separation	80 dB*/60 dB, 10 Hz to 15 kHz
Dynamic Stereo Separation	80 dB*/60 dB, 10 Hz to 15 kHz*
Stereo Amplitude Response	± 0.1 dB, 10 Hz to 15 kHz referenced to selected pre-emphasis curve
Stereo Signal to Noise Ratio (L or R)	85 dB below 100% modulation at 400 Hz; measured in a 10 Hz to 22 kHz bandwidth with 75 µs de-emphasis and DIN "A" weighting
Stereo Total Harmonic Distortion	0.005%*/0.02%, any modulating frequency 10 Hz to 15 kHz, in bandwidth 10 Hz to 22 kHz; with 75 µs de-emphasis
Stereo Intermodulation Distortion (L or R)	CCIF: 0.005%*/0.02% Note 1; (14/15 kHz 1:1)
SMPTE	0.02% (60 and 7000 Hz 1:1)
Transient Intermodulation Distortion (DIM)	0.008%*/0.02%; (2.96 kHz square wave/14 kHz sine wave modulation)
Linear Crosstalk	90 dB below 100% modulation reference (AES-3 input); L+R to L-R or L-R to L+R due to amplitude and phase matching of L and R channels (10 Hz to 15 kHz)
Non-Linear Crosstalk	80 dB below 100% modulation reference; L+R to L-R or L-R to L+R due to distortion products
Audio Overshoot	Less than 0.16 dB

Mono Performance (AES-3 or analog input)

Pre-emphasis	Selectable 0, 25, 50 or 75 µs
FM Mono Signal-to-Noise Ratio	94 dB below 100% modulation at 400 Hz; measured in a 10 Hz to 22 kHz bandwidth with 75 µs de-emphasis and DIN "A" weighting
Amplitude Response	±0.05 dB, referenced to selected pre-emphasis curve (no lowpass filter)
Mono Total Harmonic Distortion	0.002%*/0.01% THD, 10 Hz to 22 kHz bandwidth
Mono Intermodulation Distortion	CCIF: 0.005% (14/15 kHz 1:1); SMPTE: 0.005% (60/7000 Hz1:1)
Mono Transient Intermodulation Distortion (DIM)	0.005% (2.96 kHz square wave/14 kHz sine wave)

Wideband Analog Input Performance

FM Signal-to-Noise Ratio	94 dB below ±75 kHz deviation at 400 Hz; measured in a 10 Hz to 100 kHz bandwidth with 75 µs de-emphasis; DIN "A" weighting
Amplitude Response	+/- 0.005 dB 20 Hz to 53 kHz; +/-0.03 dB, 53 to 100 kHz
Total Harmonic Distortion	0.002%*/.01% THD over stereo sub band (10 Hz to 53 kHz) with 75 µs de-emphasis
Intermodulation Distortion	CCIF: 0.005% (14/15 kHz, ratio 1:1); SMPTE: 0.005% (60/7000 Hz, Ratio 1:1)
Transient Intermodulation Distortion (DIM)	0.005% (2.96 kHz square wave/14 kHz sine wave modulation)
Slew Rate	11.8 V/µs, symmetrical
Phase Response Variation	± 0.05° from linear phase, 10 Hz to 100 kHz
Group Delay Variation	± 5ns, 10 Hz to 53 kHz, ± 30 ns, 53 to 100 kHz

External SCA, RBDS Performance

SCA Format	Externally generated, analog FM subcarriers in the range 53 to 99 kHz
SCA Sub-band Amplitude Response	+/-0.5 dB, 40 to 100 kHz; high-pass filtered
SCA Channel FM Signal-to-Noise Ratio	80 dB below +6 kHz subcarrier deviation at 400 Hz with 150 µs de-emphasis

Harmonic Distortion	Less than 0.2% in audio pass-band of SCA generator
Intermodulation Distortion	SMPTE (60 and 7000 Hz, 1:1): 0.2% or less, no pre/deemphasis,
SCA generator low-pass filter bypassed Crosstalk, SCA to Stereo	80 dB below 100% modulation, L or R channel with 75 µs de-emphasis
Crosstalk, Stereo to SCA	80 dB below 100% modulation referenced to +/-6 kHz deviation and 150 µs de-emphasis
Crosstalk, SCA to SCA	80 dB below 100% modulation referenced to +6 kHz deviation and 150 µs de-emphasis per channel

Dual Internal SCA Performance

Pre-emphasis	Selectable: 150 µs, 75 µs, none
Amplitude Response	± 0.5 dB, 10 Hz to 7.5 kHz; selectable 4.3 or 7.5 kHz low-pass filter
Subcarrier Frequency	57 to 99 kHz in 1 kHz steps
Signal-to-Noise Ratio	80 dB with de-emphasis (150 µs), 65 dB without de-emphasis at +/-6 kHz deviation
Total Harmonic Distortion	0.1% 10 Hz to 5 kHz
SCA Deviation Capability	+/-1 kHz to +/-12 kHz; +/-6 kHz default
Injection Level	2 to 20%, adjustable in 0.1% increments

Specifications with Digit CD exciter

Excitation	Digit CD Digital FM Exciter
Frequency Range	87 to 108 MHz, digitally programmable in 50 Hz increments
Frequency Stability	±150 Hz, 32° to 122° F (0° to 50° C) ambient temperature range (using internal frequency reference)
External Frequency Control	Capable of locking carrier frequency to an external 10 MHz reference for use in FM synchronous applications (SFN) when fitted with optional Digit CD Sync Board (992-9850-001); sync input requirement: 2.82 V pk-pk or TTL level; sync input connector: BNC female; capable of locking 19 kHz pilot to an external 1 PPS reference for use in FM synchronous applications (SFN) when fitted with optional Digit CD Pilot Sync Digital i/o (994-9530-003).
Sync Input Requirement	2.82 V pk-pk or TTL level; sync input connector: BNC female
Harmonic/Spurious Output	Meets or exceeds FCC, IC and CCIR requirements
Modulation Type	Direct digital synthesis using a 32-bit NCO (numerically controlled oscillator)
Modulation Capability	208% (±75kHz reference standard); factory programmable in 6 dB increments to ±468 kHz
PLL/AFC Overload Characteristics	Immune to carrier dropouts caused by high energy, low frequency modulation (program audio is not applied to the VCO)
Modulation Indication	Digitally generated peak reading, 0.25% accuracy (at 150% modulation setting), color-coded LED display with baseband overmodulation indicator
Asynchronous AM S/N Ratio	55 dB minimum below equivalent 100% amplitude modulation by 400 Hz using 75µs de-emphasis (no FM modulation present)
Synchronous AM S/N Ratio	50dB minimum below equivalent 100% amplitude modulation with 75µs de-emphasis and 400 Hz highpass filter (FM deviation ±75 kHz by a 1 kHz sine wave)

Stereo Performance With Digital Input Module

Input Data Format	AES3-1992 (reference standards: AES5-1984, ANSI S4.28-1984, AES3-1985, ANSI S4.40-1992, and AES3-1992)
Sample Rate	Any in range 32 to 56 kHz (32, 44.1 or 48 kHz typically output from AES-3 devices)
Digital Stereo Generator	Complete digital composite stereo waveform generated in the digital domain from incoming AES-3 stereo audio data, using a digital signal processor (DSP)
Digital Baseband Composite Limiting	Exclusive DSP "lookahead" techniques for control of peaks before overmodulation can occur; active with on-board DSP stereo generator in stereo or monaural mode; pilot carrier and SCA signals unaffected; limiter on/off and limit setting adjustable from 0 to 18 dB either locally or by standard remote control systems
Pre-emphasis	0, 25, 50 or 75 µs, locally selectable
Stereo Separation (sine wave)	65 dB or greater, 10 Hz to 15 kHz
Dynamic Stereo Separation (complex waveform)	55 dB or greater, 10 Hz to 15 kHz
Amplitude Response (L or R)	10 Hz to 15 kHz, ±0.2 dB referenced to selected pre-emphasis curve
FM Signal-to-Noise Ratio (L or R)	80 dB below 100% modulation at 400 Hz; measured in a DC to 22 kHz bandwidth with 75 µs de-emphasis and DIN "A" weighting; does not exhibit the subsonic noise associated with analog exciters
Stereo Total Harmonic Distortion	0.005% or less for any modulating frequency from 10 Hz to 15 kHz; measured in DC to 22 kHz bandwidth with 75 µs deemphasis
Intermodulation Distortion (L or R)	CCIF: 0.03% (14/15 kHz 1:1), SMPTE: 0.03% (60 and 7000 Hz 1:1)
Transient Intermodulation Distortion (DIM) (L or R)	0.005% (2.96 kHz square wave/14 kHz sine wave modulation)
Linear Crosstalk	L+R to L-R and L-R to L+R due to amplitude and phase matching of L and R channels (DC -15 kHz): 85 dB below 100% modulation reference
Non-Linear Crosstalk	L+R to L-R and L-R to L+R due to distortion products: 75 dB below 100% modulation reference, DC -15 kHz
RBDS/RDS Synchronizing Signal	19 kHz quasi-sine wave, nominal 5.6 V pk-pk, AC coupled, 100 ohms output impedance (unbalanced); for use by customer-supplied, external generator. BNC female connector
Stereo/Monaural Mode Control	Selectable locally or by standard remote control systems; zero amplitude pilot monaural mode
Emergency Analog Composite Mode	Switchable locally or by standard remote control systems to mute the on-board DSP stereo generator and accept analog composite stereo on SCA Port #2; nominal input sensitivity (all SCA ports in this mode): 3.5 V pk-pk (1.24 V RMS) for ±75 kHz deviation; FM signal-to-noise ratio: 85 dB below 100% modulation; total composite harmonic distortion: 0.02%

Composite Input Performance With Analog Input Module

Inputs	(2) XLR female balanced (switchable, composite or monaural), and BNC female unbalanced
Input Impedance	Balanced/unbalanced: 10,000 ohms nominal (resistive)
Input Level	3.5 V pk-pk (1.24 V RMS) nominal for ±75 kHz deviation
FM Signal-to-Noise Ratio	90 dB below ±75 kHz deviation at 400 Hz; measured in a DC to 100 kHz bandwidth with 75 µs de-emphasis; DIN "A" weighting; does not exhibit the subsonic noise associated with analog exciters
Amplitude Response	±0.01 dB, DC to 53 kHz; ±0.25 dB, 53 kHz to 100 kHz
Total Harmonic Distortion	96 dB or 0.0016% THD (FFT measured at 12.5 kHz)
Intermodulation Distortion	CCIF: 0.01% (14/15 kHz 1:1); SMPTE: 0.01% (60/7000 Hz 1:1)
Transient Intermodulation Distortion (DIM)	0.005% (2.96 kHz square wave/14 kHz sine wave modulation)
Slew Rate	9 V/µs, symmetrical
Group Delay Variation	±5 ns, DC to 53 kHz, ±50 ns, 53 kHz to 100 kHz
Phase Response Variation	±0.1° from linear phase, DC to 53 kHz

Analog Stereo and SCA Performance

NOTE: Analog stereo and SCA performance with the Digit CD exciter is defined almost entirely by the program link and external generators.

All specifications referenced to any single output frequency (87 to 108 MHz) nominal rated output power, and 50 ohms, isolated, nonreactive load.

* Specifications defined in a laboratory environment with high grade source and demodulation equipment. Standard factory measurement does not include all listed items.

ONE Company for Workflow Solutions Throughout the Media Chain

Harris is the ONE company delivering interoperable workflow solutions across the entire media delivery chain — providing today's broadcaster with a single, integrated approach to capitalize on the benefits of IT and mobile applications. By providing unparalleled interoperability across our product portfolio, Harris is able to offer customers integrated solutions that improve workflows, save money, enable new revenue streams and provide a migration path to emerging media business models. To meet the evolving needs of broadcast, distribution, government agencies and entertainment businesses, Harris is the ONE answer for change.

Service And Support

At Harris, we are committed to customer service excellence. It is our goal to provide the highest level of support by applying a simple rule: We take ownership of helping our customers succeed. Our support teams consist of innovative technical experts who support all situations regarding product performance, integration and operational processing. We are adept at providing proven solutions, making workflows better and ensuring reliability of the product and system. At Harris, our experienced and dedicated teams stand ready to help you meet your goals for premium product performance, 100% up-time and reduced maintenance investment.

Warranty

Because we want to assure you that Harris stands beside its products and system solutions, our products carry a standard set of warranty services, which are competitive with — and in some cases outperform — others in the industry.

Service Packages

We offer value-add services that allow you to customize the level of services you need in meeting mission-critical performance levels. Our service package options offer many ways to upgrade your standard warranty by choosing the All-Inclusive OnePak, or by selecting individual services from our extensive portfolio. Our service and support advisors can assist in the selection of the individual services that best suit your requirements.

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For more information, please visit www.broadcast.harris.com/radio.

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